

**Amendments to the Claims:**

The following listing of claims will replace all prior versions, and listings, of claims in the application:

1-15. (Canceled)

16. (Currently Amended) A process for controlled radical polymerization using an organosulfur reversible chain transfer agent which consists in preparing polymers having a number-average molar weight of greater than ~~100 000-100,000~~ g/mol, with said polymer having a polydispersity index of less than 1.2 for number-average molar weights of less than ~~200 000~~ in the range of 100,000 to 200,000 g/mol and a polydispersity index of less than 1.4 for number-average molar weights of greater than ~~200 000-200,000~~ g/mol, with a degree of conversion of monomer of greater than 75% and a polymerization time of less than 8 h, said process comprising controlling the flux of initiator radicals in the polymerization medium.

17. (Previously Presented) The polymerization process as claimed in claim 16, wherein the control of the flux of initiator radicals is achieved by the stages consisting in:  
i) maintaining a uniform polymerization temperature  $T_1$  during the initiation period, and  
ii) continuing the polymerization, the polymerization temperature being allowed to fall to the temperature  $T_2$ ,  
it being understood that  $T_1$  and  $T_2$  correspond to the following equations (1) and (2):

$$T_1 > T_2 \quad (1) \text{ and}$$

$$T_1 - T_2 \leq 50^\circ\text{C} \quad (2).$$

18. (Previously Presented) The polymerization process as claimed in claim 17, wherein  $T_1$  is between 60 and 95°C.

19. (Previously Presented) The polymerization process as claimed in claim 17, wherein  $T_2$  is between 40 and 75°C.

20. (Previously Presented) The polymerization process as claimed in claim 17, wherein  $T_1$  is equal to 80°C and  $T_2$  is equal to 60°C.

21. (Previously Presented) The polymerization process as claimed in claim 18, wherein the monomers are monomers derived from acrylamide.

22. (Previously Presented) The polymerization process as claimed in claim 17, wherein the chain transfer agent is tert-butyl dithiobenzoate.

23. (Previously Presented) The polymerization process as claimed in claim 17, wherein the initiating agent is azobisisobutyronitrile.

24. (Previously Presented) The polymerization process as claimed in claim 16, wherein the control of the flux of initiator radicals is achieved by the use of an initiating agent having a decomposition rate constant which is greater than that of azobisisobutyronitrile at the uniform temperature under consideration.

25. (Previously Presented) The polymerization process as claimed in claim 24, wherein the initiating agent is 2,2'-azobis(2,4-dimethylvaleronitrile).

26. (Previously Presented) The polymerization process as claimed in claim 24, wherein the polymerization is carried out at uniform temperature.

27. (Previously Presented) The polymerization process as claimed in claim 24, wherein the monomers are monomers derived from acrylamide.

28. (Previously Presented) The polymerization process as claimed in claim 24, wherein the chain transfer agent is tert-butyl dithiobenzoate.

29. (Currently Amended) A polymer of acrylamide or of its derivatives having a number-average molar weight of greater than or equal to 100-000-100,000 g/mol, wherein it has a polydispersity index of less than 1.2 when the molar weight is absolutely less than 200-000-200,000 g/mol and in that it has a polydispersity index of less than 1.4 when the molar weight is greater than 200-000-200,000 g/mol.

30. (Previously Presented) The polymer as claimed in claim 29, wherein it is an N-acryloylmorpholine homopolymer.